Protective effect of aqueous seed extract of *Vitis Vinifera* against oxidative stress, inflammation and apoptosis in the pancreas of adult male rats with diabetes mellitus

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**Abstract**

Introduction: Protective effects of *Vitis Vinifera* seed aqueous extract (VVASAE) against pancreatic dysfunctions and elevation of oxidative stress, inflammation and apoptosis in the pancreas in diabetes were investigated. Histopathological changes in the pancreas were examined under light microscope. Methods: Blood and pancreas were collected from adult male diabetic rats receiving 28 days treatment with VVASAE orally. Fasting blood glucose (FBG), glycated hemoglobin (HbA1c), insulin and lipid profile levels and activity levels of anti-oxidative enzymes (superoxide dismutase-SOD), catalase-CAT and glutathione peroxidase-GPx) in the pancreas were determined by biochemical assays. Histopathological changes in the pancreas were examined under light microscopy and levels of insulin, glucose transporter (GLUT)-2, tumor necrosis factor (TNF)-α, IkBβ and caspase-3 mRNA and protein were analyzed by real-time PCR (qPCR) and immunohistochemistry respectively. Radical scavenging activity (RSA) of VVASAE was evaluated by in-vitro anti-oxidant assay while gas chromatography-mass spectrometry (GC-MS) was used to identify the major compounds in the extract.

Results: GC-MS analyses indicated the presence of compounds that might exert anti-oxidative, anti-inflammatory and anti-apoptosis effects. Near normal FBG, HbA1c, lipid profile and serum insulin levels with lesser signs of pancreatic destruction were observed following administration of VVASAE to diabetic rats. Higher insulin, GLUT-2, SOD, CAT and GPx levels but lower TNF-α, IkBβ and caspase-3 levels were also observed in the pancreas of VVASAE-treated diabetic rats (p < 0.05 compared to non-treated diabetic rats). The extract possesses high in-vitro radical scavenging activities.

Conclusion: In conclusion, administration of VVASAE to diabetic rats could help to protect the pancreas against oxidative stress, inflammation and apoptosis-induced damage while preserving pancreatic function near normal in diabetes.

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